A clean energy company

SES

January 31, 2002

California Power Authority
901 P Street
Suite 142A
Sacramento, CA 95814

Stirling Energy Systems hereby submit our comments regarding the Energy Resource Investment Plan.

These comments consist of text plus two attachments giving insight to the opportunities in renewable energy.

If you may encounter any problems, have any questions regarding the attached material or require additional information, please do not hesitate to contact our office.

Sincerely,

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Comments of Stirling Energy Systems

Introduction

Stirling Energy Systems (SES) submits the following comments on the California Consumer Power and Conservation Financing Authority's ("Authority") draft Clean Growth Energy Resource Investment Plan ("Plan"). SES is a renewable energy company developing concentrating solar power projects with its own proprietary technology and wind projects using Vestas wind technology.

SES applauds the efforts of the Authority's efforts to move forward forcefully with its mandate and to implement a "clean-growth" strategy. The draft Clean Growth Plan is clear in indicating the goals and actions for California's energy future. According to the Authority, "the heart of a cost-effective energy resource investment strategy that addresses [market] gaps and that accomplishes the intent of the Governor and the Legislature is *aggressive investment in energy efficiency and renewable energy resources*." SES believes that aggressive investment in renewable energy *must* include a focus on concentrating solar power technology, a type of solar thermal technology not mentioned in the Plan.

Concentrating Solar Power, a Different Kind of Solar Power

Concentrating solar power ("CSP") is different from the better-known photovoltaic ("PV") technology. PV concerts sunlight directly to electricity typically ranging in size from a few millivolts to 1-2 kilowatts only. Although the cost of PV cells has declined dramatically over the past 10 years they are still in the $6 per watt range and

market constrained by production capacity shortage. CSP technologies, on the other hand, use reflective materials such as mirrors to concentrate the sunlight onto a receiver, which, in turn, powers a generator. CSP technologies include dish systems, power towers, and parabolic troughs.

Unlike PV, CSP is well suited to produce grid quality electricity and is cheaper. The SES Dish Stirling technology can also be utilized as distributed generation, making it a flexible resource. Unlike many of the other CSP technologies, the SES Systems are modular and scalable. A Dish Stirling plant can range anywhere in size from 25 kW to 100s of MWs, depending upon the requirement. In addition, Dish Stirling Systems are adaptable to mass manufacturing, dramatically reducing the costs.

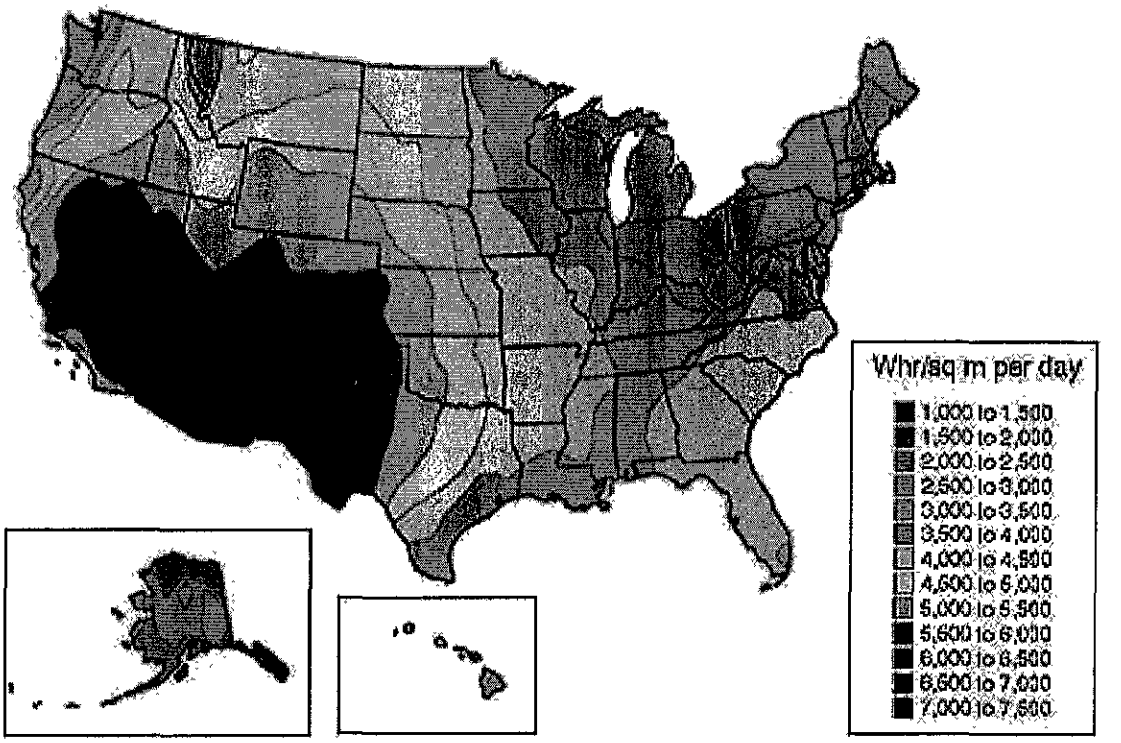
The U.S. Department of Energy formed a partnership between its National Renewable Energy Laboratory and Sandia National Laboratories – SunLab – to develop CSP technologies. According to SunLab, CSP technologies "have the potential to provide the world with tens of thousand of megawatts of clean, renewable, cost-competitive power beginning in the next few years." Although able to be used off-grid for down to a few kilowatts of power, CSP technologies can also be grid-connected and provide 100s of MW of power. In fact, according to SunLab, CSP technologies "currently offer the lowest-cost solar electricity for large-scale power generation (10 MW and above)." SunLab notes that although current cost is 9-12 cents per kWh, future technology advancements will allow the cost to drop to 4-5 cents per kWh in the next few decades.

CSP projects are currently being developed in India, Egypt, Morocco, and Mexico, and being explored in Greece, Spain, and other countries. Nonetheless, no CSP

projects are being actively developed in the United States. Given the vast solar resources of the Western U.S., including large areas of California, SES believes that the Authority should focus a part of its renewable energy strategy on these resources.

The Solar Resource in California

As can be seen by the U.S. Department of Energy map below, California has some of the best solar resource potential in the country.



Source: The Department of Energy

The Plan includes an appendix of Authority signed letters of intent for renewable energy. Notably absent are any solar projects. SES wishes to submit a bid and work with the Authority to further develop concentrating solar power in California.

At this time, California has some older versions of concentrating solar power technology in the Kramer Junction area. For a variety of reasons this technology,

originally developed after the energy crises of the 1970s, was not actively pursued. In 1996, SES purchased and entered into contracts in order to further develop the Dish Stirling system that had been previously developed by McDonnell Douglas (now Boeing) and Kockums of Sweden. Attachment 1 contains more information about the SES technology. SES has made significant strides towards commercialization, with production of its new generation of systems planned to begin in 2002.

Other Advantages of Concentrating Solar Power Technology

In addition to the benefits listed above, CSP has other favorable factors. First, they use only sun as fuel, avoiding fuel-price fluctuation. Lack of reliance on other fuels along with low operating costs also allows for a levelized rate for power over the life of the project. Second, along with improving air quality, CSP technologies have generally small, if any, other adverse environmental consequences. Finally, building grid-quality solar power plants utilizes land, often in remote areas, that is being underutilized.

How the Authority Plan Can Work to Promote CSP Technology

The Authority Plan suggests adding 8000 MW of renewable capacity by 2006 to meet the governor's goal of 17% renewable contribution to the total state energy portfolio. California's current renewables mix is 2% biomass and only 7% "from the cleanest renewable sources – geothermal, wind, and solar energy." Further, "new plant that has come online since 1999 or currently under construction is 96% natural gas, 2% wind, 1.2% geothermal, 0.6% biomass and 0.1% hydro." Along with efforts to increase geothermal, wind, and PV, the Plan needs to include CSP to meet its aggressive goal.

The graph on page 13 of the Authority draft Plan shows the solar portion of California's portfolio by combining PV and Solar Thermal. These are two very different

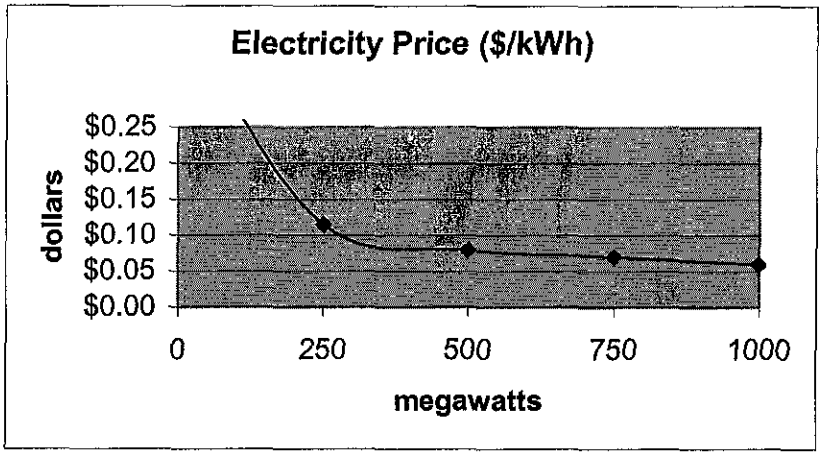
types of technologies with very different market potential. The Plan addresses the use of PV in the distributed generation section but makes no mention of solar thermal. This is an oversight that needs to be corrected. California should include the next generation of CSP technology in its plans toward a clean energy future.

The challenge in the short-term is the cost. The primary cost for a Dish Stirling system is the initial capital cost. Thus, the manufacturing cost is directly reflective on the price of power produced. As SES begins to produce its system in large volumes, the price will drop dramatically due to economies of scale. This has been seen with other renewable energy technology: wind moved from 80 cents down to 4-6 cents per kWh and PV has gone from $2.00 to 30-40 cents per kWh. This phenomenon is contemplated by the Authority's Plan.

While initial capital costs of a renewable plant are somewhat higher than a fossil-fueled plant, operating expenses are lower through the economic life of the project. This means that, for certain commercially available renewable technologies, the present value of a renewable plant project equals or exceeds that of a fossil-fueled plant. Even without factoring the value of external economic environmental factors, renewable source projects can deliver competitively priced retail and wholesale electricity and attractive yield to investors in those projects.

The installed cost is a direct function of manufacturing volume. SES expects manufacturing costs to decrease dramatically as volume of output increases. At a production rate of 2,000 units per year, the capital cost of one unit is $2,500 - $3,000 per installed kW. At a production rate of 12,000 per year however, the capital cost is expected to be in the $1,200 per installed kWh range. SES is also aggressively pursuing

cost reduction and design improvements for its Dish System. As production levels are increased and manufacturing costs are decreased, SES expects the price to drop, resulting in a projected levelized energy cost of approximately $0.06 cents. This is depicted graphically below.



The plan cites the CEC forecasts of the retail power rate for IOU customers over the next decade at 8 cents. The Plan notes that many sources of grid renewable power are competitive with this 8-cent figure. While wind, for example, has reached this competitive stage, it is clear that CSP technologies can only achieve this cost with more market. The Plan notes that lack of a wholesale market and the high initial capital cost of renewable energy projects are the two major impediments to grid quality projects. The Authority says that the role it "can play is to provide lower cost financing for the capital-intensive projects." The other role that the Authority can play is by assisting in creating a market, as the Plan suggests.

In addition, the Authority can take two primary steps to insure that concentrating solar power becomes part of California's future. First, the Authority can assist by simplifying and streamlining the processes for allowing companies to enter the market.

Although SES has approached the State and various utilities, the current programs for financial assistance exclude concentrating solar power technology. Second, the Authority can, as suggested, facilitate financing for renewable energy projects. As CSP technology reaches mass volume, the price will be more then competitive with projections of the anticipated power costs of conventional technology for the future. By opening the market and assisting with financing, the Authority will insure that California remains a leader in renewable energy.

Transmission Issues

SES supports the Authority's suggestion that the Legislature extend the Authority's ability to finance certain transmission activities. One effect, for example, of freeing-up transmission space on Path 15 would allow CSP facilities to be built in the best solar areas of the State while allowing the power generated to be delivered both South and North.

The Dish Stirling technology can also be utilized in a distributed generation fashion, as noted earlier, to avoid transmission constraint issues.

Conclusion

SES looks forward to working with the State of California in further developing its renewable energy resources.

Attachment 1
SES Solar Technology

Concentrating Solar Power is "Fuel from the Sky"

In the past, the majority of solar generation was installed for remote-use application. For this application, photovoltaic ("PV) panels have been the best-suited technology. As utilities gain more involvement with solar generation however, solar thermal technologies, especially concentrating solar power ("CSP") is gaining more attention. CSP technologies use reflective materials such as mirrors to concentrate the sun's energy and convert it to electricity. These technologies are much more cost-effective and practical then PV for centralized plants. According to the Department of Energy, at least 7,000 MW of centralized renewable power plants will be built by the year 2020, and possibly much more.

In December of 2001, a peer review Panel for the Department of Energy's CSP program concluded that "[w]ith proper funding the DOE CSP program can play an important role in catalyzing further CSP technology advances, which will further improve CSP economies and market penetration. Ultimately, CSP technologies could contribute significantly to the U.S. supply of electricity from domestic resources. In the short term, CSP could make a difference for the US by adding diversity and security to our energy supplies, particularly in the high-grade areas of the Southwest."

The SES Technology

The SES Dish Stirling system is composed of two major components: the solar concentrator and the power conversion unit (PCU).

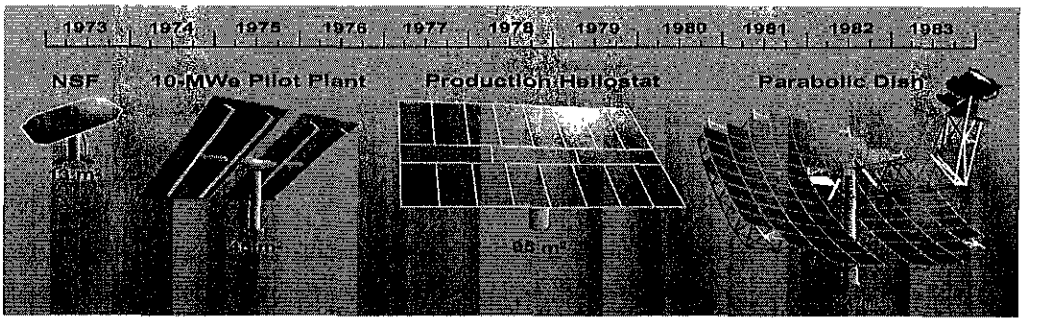
The solar concentrator. The large parabolic concentrator is fabricated in a factory (rather than on site) to ensure proper quality and alignment. It is designed in five subassembly units for ease of transport and installation on site. The 89 mirror facets are attached to the frame by three-point adjusting mounts at specific points on the subassemblies. When final alignment adjustments are made at the factory, the facets are locked into place before the system is shipped so as to eliminate the need for adjusting mirror facets at the site. The subassembly design permits units to be transported to an installation site by truck.

Site preparation involves sinking a cement base with an imbedded pedestal to support the dish, with the subassemblies unloaded, bolted together and affixed to the pedestal by two workmen in about four hours. No crane is required. Two small motors, an azimuth drive and an elevation drive, are attached to the pedestal and programmed to swivel the dish on two axes, following the sun's progress across the sky during the day.

At the end of the day, the system controller commands the concentrator to tilt down into a "night-stow" position, with the engine at ground level. Each morning, the system wakes up, putting it in position to greet the sun, rather like a robotic sunflower. The system is built to withstand winds of up to 100 mph, but as a precaution, the system controller automatically "tilts up" when winds reach about 35 mph. The concentrator achieves its lowest profile in this position, thereby preventing strong wind loads to cause damage to structural components. In addition, in the event of a malfunction, the Fast Slew System automatically

moves the sun's focused beam two feet off the receiver of the PCU, thereby avoiding damage to any parts of the system.

Solar Concentrator History



Over $100 million invested by McDonnell Douglas/DOE

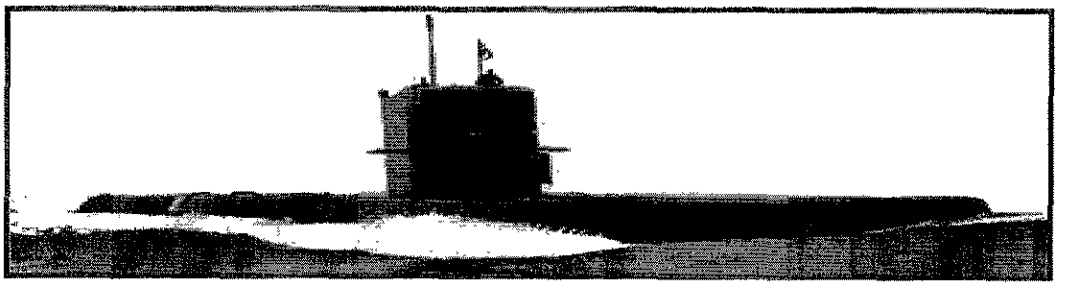
The power conversion unit ("PCU"). The engine's cylinder block incorporates four sealed cylinder assemblies (pistons, piston rods, and connecting rods domes) along with coolers, regenerators and heater heads. Concentrated solar energy heats up self-contained gas in the PCU, causing the gas to expand into the cylinders. Inside the cylinders, the pressure from the expansion pushes the piston assembly toward the crankshaft while at the same time gas from an adjacent chamber that has been cooled is contracting, pulling the piston assembly. So, there is a double "push – pull" action on the piston assembly. The movement of the piston assembly creates linear motion, which is converted into the familiar rotational movement of the crankshaft. This rotational movement is then converted into electricity by the generator, which is attached to the unit. There is a 90-degree timing separation between adjacent cylinders and the working gas is exchanged repeatedly back and forth between the same adjacent cylinders. This cycle is repeated over and over as the engine runs at a steady rate of 1,800 rpm (a low-stress, long duty-life regimen for a conventional gasoline engine).

The working gas used by the engine is pressurized hydrogen, stored in the same kind of steel tanks used in welding and other conventional industrial applications. The gas is cycled repeatedly so the same gas continues to work indefinitely, though routine maintenance includes recharging the hydrogen tanks once or twice each year.

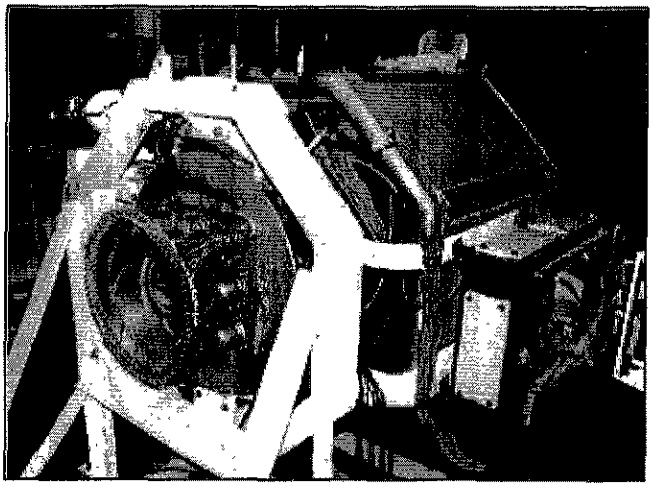
Unlike familiar auto or truck engines, Stirling engines do not rely upon internal combustion to drive the pistons and rotate a crankshaft. In fact, there is no combustion at all. Power is generated by heat transfer from the concentrated solar rays to the working gas in the engine's heater head, which converts the heat energy into mechanical motion. This power runs the electric generator, which produces electricity with an output of 480 Volts and 60 Hertz, so it is already power-conditioned by the generator's interface. The generator of each unit in a utility-scale project is connected by underground wire to a small substation where the power can be transformed into a higher voltage for more efficient transmission across the grid.

Attachment 1
SES Solar Technology

Kockums Stirling Engine Development for Non-nuclear Submarines



$250M invested over 30 years
$15M to solarize engine



Technology History

Development of the Kockum's Stirling engine began in the early 1970s when United Stirling AB (USAB) of Malmo, Sweden started the design of a "4-95" kinematic Stirling engine. In the late 1970s and early 1980s, USAB, under contract from the Jet Propulsion Laboratory (JPL) and the U.S. Department of Energy (DOE), designed, fabricated, and tested "solarized" versions of the USAB 4-95 Stirling engine at the Georgia Tech Advanced Component Test Facility (ACTF) and at the JPL Solar Test Facility at Edwards Air Force Base. Because the system demonstrated excellent performance, a DOE program was initiated with Advanco Corp. in which a USAB 4-95 Stirling Power Conversion Unit (PCU) was integrated with the Vanguard concentrator. This system demonstrated very high efficiency and established records for conversion efficiency of direct normal solar insolation to electricity.

Attachment 1
SES Solar Technology

In the early 1980s, McDonnell Douglas (now Boeing) and USAB formed a joint venture to commercialize a dish Stirling system based on the 4-95 PCU and a McDonnell Douglas-designed solar concentrator. Systems were installed at the McDonnell Douglas test site in Huntington Beach, CA and several utility test sites. Testing at these sites continued through late 1988.

SES was formed in 1996 with the objective of acquiring, developing and commercializing the production of electrical energy from the sun using Dish-Stirling Point-Focusing Distributed Receiver (PFDR) technology. SES has acquired the intellectual and technology rights to the McDonnell Douglas (MDA) concentrator and the license to manufacture the USAB (now Kockums) 4-95 Stirling engine-based PCU.

Commercialization

Since April 1998, SES has been moving toward commercial production of its Dish Stirling System through the DECC Program (Dish Engine Critical Components), a $920,000 cost-share program between Boeing, SES, and Sandia/DOE to incorporate design enhancements to the Stirling engine and other components of the PCU to increase performance and decrees operation and maintenance costs. Sandia Labs contributed 52% of the contract price, with 48% being contributed by SES.

The Contract set out an ambitious six-point multi-task work program including both bench-testing and on-sun testing of Stirling engine-based PCUs. Phase I was successfully completed in August 1999 and resulted in significant engineering refinements, which SES is incorporating in the current dish Stirling system. It was particularly significant that the McDonnell-Douglas systems, which were constructed in the mid-80's, remained on-sun during the interval and were merely refurbished for the DECC testing project, performed at the same rates as they had fifteen years or so earlier. This serves to demonstrate the endurance capability and longevity of the system.

Phase II began in October 1999, using the two dish Stirling modules from Phase I and two additional 4-95 Stirling engines. It is a larger $6.2 million project (also cost-shared with DOE's Sandia Labs). This contract is aimed at system integration, incorporating additional bench tests and on-sun tests of Stirling engine PCUs, grid tests and a business and marketing component. The work program will continue through 2002 with plans to construct two new generation systems this year.

Ready for Commercial Production

Detailed technology reviews of the SES Dish Stirling System were delivered in April 2001, at the proceedings of Solar Forum 2001, by the project manager for the Sandia National Laboratories and representatives of Boeing, Kockums and SES. The reports presented data documenting the operation and service requirements of the SES dish Stirling energy system. Among other things, they reported:

Attachment 1
SES Solar Technology

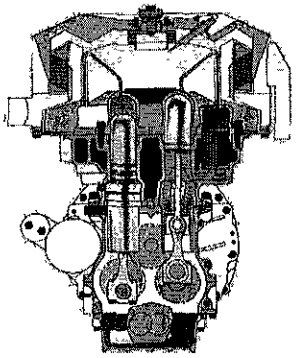
- Since April 1998, SES Stirling engines (PCUs) accumulated over 10,800 hours of on-sun operating time, generated over 149 MWh of electricity and logged more than 12,000 hours of bench test operations.
- Daily energy plots show net energy efficiency output of between 24% and 27%.
- System availability was better than 94% during periods of insolation over 300 W/m^2, even taking into account "off-sun" events related to the testing program.

The report concluded that "based upon the performance of the systems and the data presented in this paper, there appear to be no serious obstacles to the commercialization of this technology."

To this day, the SES Solar Technology holds the World's Record (29.4%) for sun-to-electricity efficiency. The technology has also demonstrated long life and excellent reliability with systems over 17 years old and still operating like new. The system is modular, scalable, and environmentally safe.

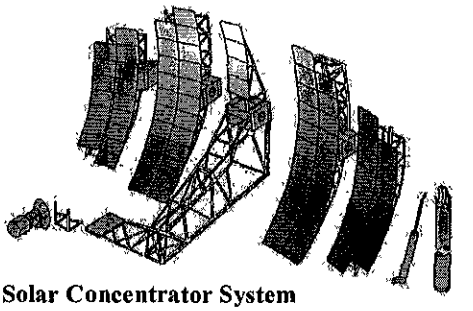
Attachment 1
SES Solar Technology

The SES Dish Stirling System Offers High Availability, High Efficiency and High Reliability.



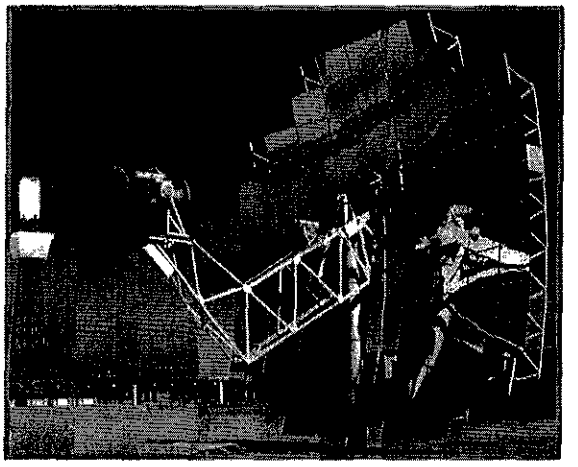
4-95 Stirling PCU
- 40% efficiency
- Rated power of 25kW at 1800 RPM

Induction Generator
- 94.5% efficiency
- 3-phase/480 volt AC
- Cost effective



Solar Concentrator System
- 11 meter diameter
- Balanced concentrator design
- 94.1 m2 aperture area
- 2 axis tracking system

Direct Impingement Receiver
- Proven design
- 89.7% efficiency



5 Major Subassemblies
- Modular structure
- Ship by truck
- 4-hour assembly

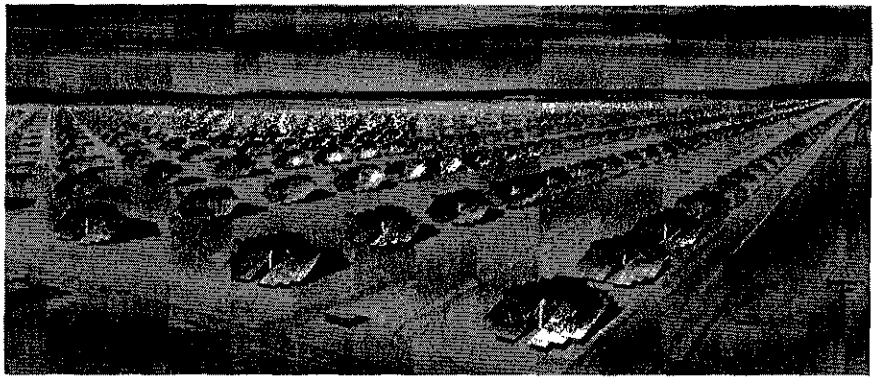
Mirror Facets
- 82 per Concentrator
  1 m x 1.5 m
- Reflectivity 92 to 94%

Azimuth & Elevation Drives
- Off the shelf hardware
- Counter balanced

Single Post Support
- Inexpensive
- Small footprint

Typical Plant Layout

- 10 MW = 400 Gensets
- Land required: Approx. 40 acres
- 1% solar shading

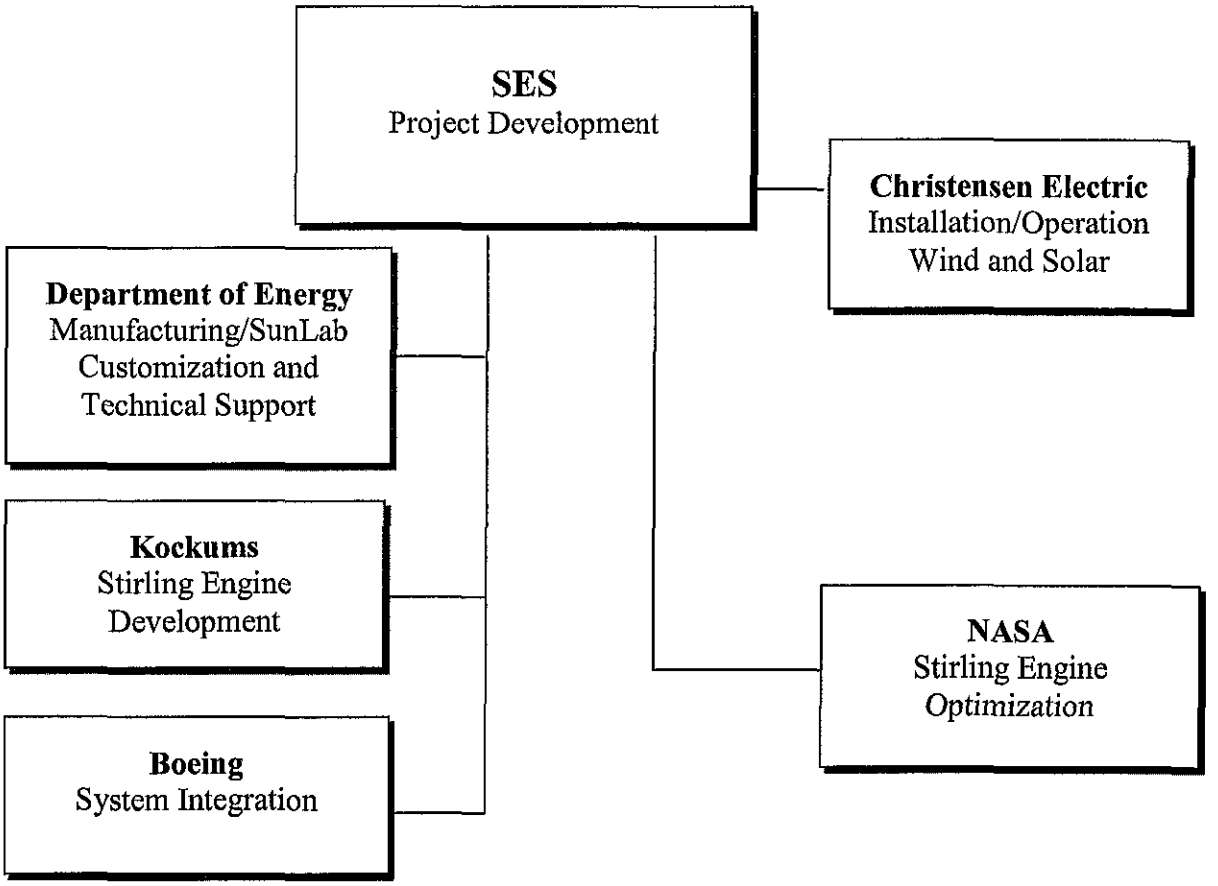


Attachment 1
SES Solar Technology

Attachment 2
SES Strategic Alliances and Management

Strategic Alliances

Several important teaming relationships with strategic partners augment the SES management team and staff, providing significant engineering, technical, and project development support.



- **Kockums, AB,** a Swedish company which manufacturers submarines for the Swedish, Japanese, and Australian navies, invested over $250 million over a 30-year period developing the Stirling engine. Kockums granted SES both exclusive and non-exclusive licenses to manufacture, distribute and market the engine worldwide.
- **NASA-Glenn Laboratories** has been involved in Stirling engine research and development for the past 15 years, and provides technical advice to SES.
- **U.S. Department of Energy (DOE)** provides additional research and development support of the Dish Stirling System under an ongoing government contract.
- **The Boeing Company** is a teaming partner with SES and the U.S. DOE. Boeing developed the SES solar concentrator during the early 1980s, spending $50 million.
- **Christenson Electric**, based in the Pacific Northwest, is a $100 million electrical contractor specializing in large-scale electrical installations. Christenson is becoming a premier contractor for the construction and installation of wind systems. In addition, Christenson is working with SES to install its solar facilities.

Attachment 2
SES Strategic Alliances and Management

Executive Management

The SES management team is comprised of a cohesive and experienced group of engineers, business managers, and energy experts.

- **David J. Slawson, Chairman, President and Chief Executive Officer** – David Slawson has served as President of SES since April of 1996. Mr. Slawson is Chairman of the Board and has been responsible for securing virtually all of the financing for all operations to date, including the financing that allowed SES to acquire the McDonnell Douglas solar concentrator technology and the Kockums license agreement. He has also been actively involved in securing business relationships in a number of international markets.
  Prior to his affiliation with SES, Mr. Slawson served as President and CEO of Global Environmental Solutions Corporation, a broad-based technology and information services company focusing on sustainable clean energy solutions and the necessary financial resources to commercialize those technologies. In 1994, Mr. Slawson co-founded Sustainable Technologies, Inc. (STI) located in Maui, Hawaii, which is developing bioconversion systems to convert biowastes into useable products. Mr. Slawson graduated with a B.A. from Portland State University in 1972.

- **Robert B. Liden, Vice President and Chief Financial and Administrative Officer** – Mr. Liden joined the Company in November 1998 and has served as Secretary/Treasurer of the Board since that time. He is an engineering and financial analyst with 30 years of experience in the areas of manufacturing, development and production engineering. Mr. Liden's primary responsibilities include: financial planning and budgeting; design and implementation of project controls, scheduling, and monitoring; and human relations and general administration.

  From 1992 to 1998, Mr. Liden was the Senior Vice President of General Acceptance Capital Corporation, a Phoenix-based investment banking firm specializing in mergers and acquisitions of manufacturing companies. From 1980 to 1992, Mr. Liden served as Vice President of Trans Energy Corporation, a product development and engineering consulting company. Earlier, Mr. Liden was Corporate Vice President of

  Budgets and Strategic Planning for Ramada Inns, Inc., and founder and President of Ramada Energy Systems, a solar energy product development company. Mr. Liden started his career on the Corporate Finance Staff of Ford Motor Company after receiving his B.S. and M.B.A. from UC Berkeley in 1965 and 1966, respectively.

- **D. Bruce Osborn, Vice President and Chief Operating Officer** – Mr. Osborn leads the effort within SES to enhance and standardize manufacturing program management. He is responsible for coordinating cross-functional efforts in engineering, operations, materials procurement, supplier engineering, marketing, product assurance and factory operations.
  Prior to joining SES in July 1999, Mr. Osborn was Senior Director for Development

Programs with Western Digital Corporation. In this position, Mr. Osborn led production and development of a number of revolutionary next generation performance desktop disk drives for WDC, a Fortune 500 company. Each product development program ranged in length from 6 to 12 months, involved 50 to 100 engineers, and had a budget of approximately $50 million. From 1977 to 1997, Mr. Osborn was Program Manager at Lockheed Martin Aeronutronic (formerly Loral Aerospace and Ford Aerospace). Mr. Osborn holds a B.S. degree in Mechanical Engineering from the University of California and a M.S. degree from U.S.C.

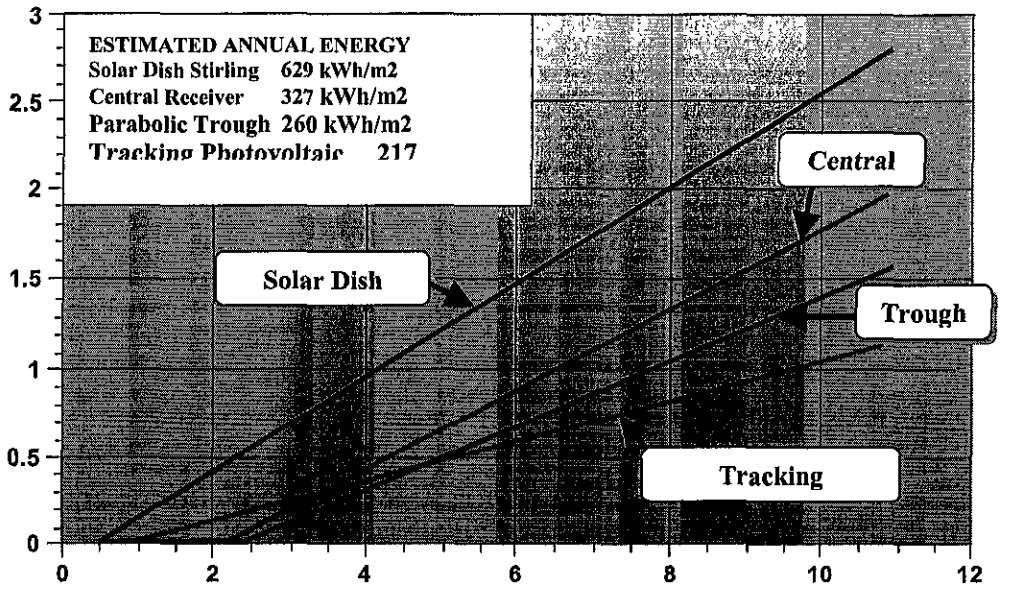
- **Steven P. Levine, J.D., Consultant** – In his capacity as a senior executive in the energy project development industry, Mr. Levine has been responsible for the developing and financing of several large and small scale cogeneration, mechanical equipment, energy management, and environmental remediation projects. Mr. Levine's representative project experience includes over $1 billion in capital value electrical projects. Mr. Levine, of Handshake Energy, is under contract to SES to provide business development and contract negotiation assistance.

- **Lori A. Glover, J.D., Director of Industry Affairs** - Ms. Glover recently joined the SES team with 15 years of energy experience, primarily as counsel to electric and natural gas utilities or to industrial customers of utilities, both in private practice and as in-house counsel in various western states. Her clients have included El Paso Natural Gas, the Williams Companies, Salt River Project, and customers of the Bonneville Power Administration. Ms. Glover specialized in regulatory matters, government relations, project development and construction, and general corporate matters. Ms. Glover has also held management positions and has, most recently, been involved in sales and marketing in the high-tech industry. Although not acting in a legal capacity for SES, Ms. Glover relies on this background SES in dealing with utilities and with regulatory matters. She will also be handling government relations, marketing, and project development matters. She received her J.D. from Northwestern School of Law of Lewis & Clark College and her B.A. from Oberlin College.

Other Advantages of the Dish Stirling Concentrating Power Technology

SES Efficiency Advantages

In side-by-side testing of all four concentrating solar technologies over a period of several years, data from Southern California Edison shows the Dish Stirling System to be, by far, the most efficient. See attached diagram for results. This efficiency, coupled with the lower potential product cost of the Dish Stirling System in mass production quantities, leads management to believe that SES will be highly competitive.



Source: Southern California Edison and Sandia National Laboratories

Not Subject to Inflation or Fluctuation in Fuel Costs

A Dish Stirling system uses sunlight as its only fuel; thus, the price of the power is not subject to changes in fuel costs. In addition, the primary costs are the initial capital costs, making the price of power immune to inflation.

Simple Operation and Maintenance

The SES Stirling Dish system is designed for a life of 30 years and includes provisions to facilitate operation and maintenance activities. It operates automatically and does not require operator monitoring or hands-on attention. Maintenance functions typically are scheduled during the hours when the plant is already off-line. Thus, the plant can take full advantage of daytime solar insolation periods. The primary solar concentrator maintenance activity is reflector washing, typically performed once a month in the dormant hours between sunset and sunrise. With respect to the Stirling power conversion unit, primary maintenance occurs every 5,000 or 6,000 hours of operation. The system is designed in modules that are easily replaced in the field. When a problem occurs and is isolated to a particular module, the module is replaced and the faulty module is returned to a maintenance facility for repair.

The 25,000 hours of "on-sun" operation accumulated by a number of units since the mid-1980's provides a significant database from which to calculate system O&M costs, costs which are quite low. Additional information about system performance is shown in Attachment 2.

Long-Life with Limited Performance Degradation

The Dish Stirling System is inherently superior to photovoltaic systems in that its performance does not inevitably degrade with time. Unlike other solar concentrator systems, the SES Dish design shows no significant age-related loss of mirror reflectivity, an essential functional parameter of the system. Mirror panels manufactured 16 to 17 years ago have been continuously exposed to the environment and repeatedly cleaned throughout that period and, remarkably, they still meet the original performance requirements. With respect to the Stirling engine, any long-term (6000 operating hours)

seal wear degradation is eliminated by periodic replacement. Experience shows that the original performance of the engine is fully recovered by this process.

Environmentally Pristine

In addition to air quality benefits, Dish Stirling systems are environmentally pristine:

- First, there are no air emissions of any kind.
- Second, with the exception of the antifreeze used in the cooling system and the small amount of oil lubricant used in the Stirling engine, there are no toxic chemicals.
- Third, the only water used in a Dish Stirling power plant is that used for periodically washing the mirrors - only approximately 4.4 gallons per MWh of energy produced. The water is de-ionized and mixed with a non-toxic compound that has been approved for use in California, even over an aquifer.
- Fourth, a Dish Stirling plant utilizes approximately one acre per 9-10 Systems, plus a small additional amount of land for the office and control room, perimeter security areas, substation, equipment maintenance and storage areas, and parking, as needed.
- Fifth, Stirling-cycle engines do not utilize a process of internal combustion, and are thus remarkably quiet during their operation, emitting less than 66 dB at full load and would typically be placed in remote areas so that even the minimal amount of noise that is generated is not expected to pose any problems.
- Sixth, the installation of an SES Dish Stirling system is comparable to the planting of a tree. It has a single post support structure that is only about 18 inches in diameter with a small foundation. The primary impact to the area will be the shade provided by the solar concentrator system and there is normally no effect on biological, cultural, paleontological, or geological resources, aside from construction activities.
- Finally, with the exception of tourist traffic, the SES Dish Stirling Power Plant is not expected to have any significant impact on local traffic and transportation.

February 8, 2002

Ms. Laura Doll
Chief Operating Officer
Consumer Power and
Conservation Financing Authority
901 "P" Street, Suite 142A
Sacramento, CA 95814

Re: 2002 Energy Resource Investment Plan

Dear Ms. Doll:

On February 1, 2002, Stirling Energy Systems ("SES") submitted comments on the draft *Clean Growth: Clean Energy for California's Economic Future* ("Plan"). In these comments SES mentions a procedural issue, which it wishes to highlight here due to its importance.

SES is a renewable energy company that develops both wind and solar projects. Its solar technology is not photovoltaic ("PV"), but a type of solar thermal power known as concentrating solar power ("CSP"). The Department of Energy ("DOE") is currently working with the CSP industry on a number of on-going programs. In addition, at the request of Congress, the DOE is developing a proposal to install 1,000 MW of CSP generation by 2006, with a significant portion of the costs being paid by the federal government.

Section 4 of the Plan discusses CPA's strategy for California to install 8000 MW of additional renewable and decentralized capacity by 2006; however, CSP is excluded from the strategy. According to the Plan, the first source will be proposals received under the CPA's renewable generation solicitation process while the second source will be projects from the CPA's new renewable resources account auction process. Both of these sources, by definition, exclude CSP.

CSP technologies include Dish Systems, Parabolic Trough Systems, and Power Tower Systems. Each of these technologies has the potential to supply hundreds of megawatts of power directly into the grid from a centralized plant. The SES technology, its proprietary Dish Stirling System, also may be utilized as distributed generation in amounts as small as 25 kilowatts. In addition, the CSP technologies have the potential to be much more cost-effective then PV, down to as low as six cents per kilowatt/hour in the next five years.

SES wishes to participate in California's clean energy program; however, there is no mechanism in place to allow it to do so. SES's technology is not encompassed by the definitions currently being used by the CPA for soliciting bids. Further, the procedures to not accommodate unsolicited bids. SES wishes to insure that its technology, and other

CSP technologies, is not being overlooked in California's quest to increase its renewable energy generation.

For your information, SES is enclosing a copy of a Fact Sheet regarding its technology. Additional information regarding SES is available in the Attachments filed with its comments. We look forward to continued discussions with the CPA in order to assist California in reaching its renewable generation goals.

Bob

SES

STIRLING ENERGY SYSTEMS

A clean energy company

FACT SHEET

SOLAR DISH STIRLING SYSTEM

ENERGY FOR TODAY'S NEEDS & TOMORROW'S DEMAND℠

STIRLING ENERGY SYSTEMS

PROVEN TECHNOLOGY GENERATING COST COMPETITIVE ENERGY

SUPERIOR SOLAR TECHNOLOGY

- Ready for distributed and central power plant applications today
- Scalable to meet market demand (25 kWe to more than 1,000 MWe)
- Outperforms the competition by a factor of 2*
- World's highest solar efficiency record since 1984**

EXCEPTIONAL TRACK RECORD

- Over 16 years of documented operation, reliability and performance
- Over 25,000 hours of on-sun operation
- Over 125,000 hours of engine bench test operation
- Developed in conjunction with U.S. D.O.E., Boeing, Ford, Volvo and Kockums of Sweden

SIGNIFICANT BENEFITS

Economics

- Low maintenance and operating costs
- Energy generation matches peak loads – Power when you need it most
- Long-term price stability – no fuel costs
- Provides carbon trading credits

Employment

- Generates job growth for local economies
- Creates a sustained job market for high-end employment

Environment

- Renewable, non-polluting and emission free
- Conserves fossil fuel resources

* In independent, side-by-side testing conducted by Southern California Edison and the National Renewable Energy Laboratory (NREL), the SES system produced over twice as much power per square meter of collector aperture area as competing 2-axis tracking photovoltaics, parabolic trough and central receiver systems.

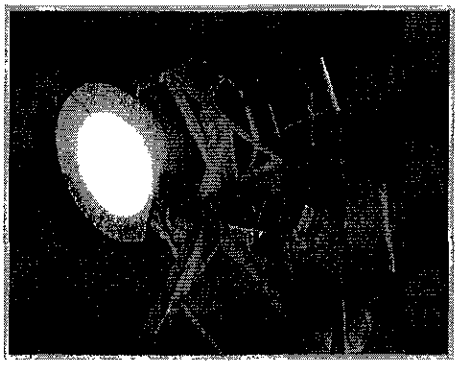
** 29.4% efficiency (net), defined as amount of grid-quality electricity produced divided by the amount of direct normal solar insolation.

FOR MORE INFORMATION, VISIT OUR WEBSITE AT

www.stirlingenergy.com

Solar Dish Stirling System

Power Conversion Unit



4-95 Stirling Engine
- 40% efficiency
- Rated power of 25kW at 1800 RPM
- Cost competitive

Induction Generator
- 94.5% efficiency
- 3-phase/460 volt AC
- Cost effective
- Market ready

Direct Impingement Receiver
- 89.7% efficiency
- Proven Design

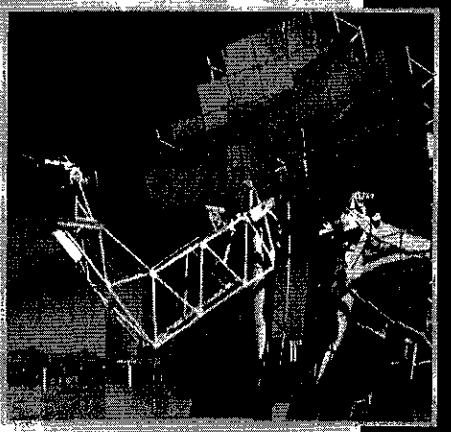
Concentrating Dish

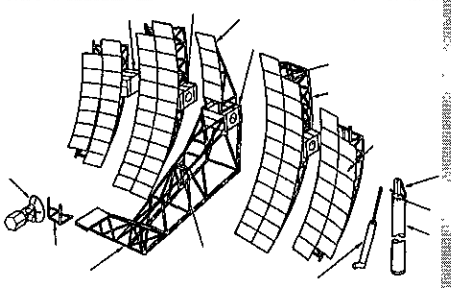
5 Major Subassemblies
- Modular structure
- Ship by truck
- 4-hour assembly

Mirror Facets
- 89 per Concentrator
- Reflectivity 94%

Drives
- Elevation - production linear actuator
- Azimuth - worm/planetary configuration
- Proven performance and reliability

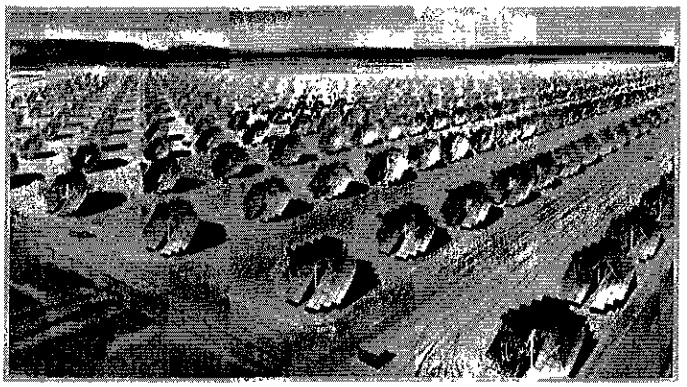
Single Post Support
- Inexpensive
- Small footprint





Solar Concentrator System
- 11 meter diameter
- Patented balanced design
- 94.1 m² aperture area
- Double axis tracking system

Solar Dish Stirling Power Plant

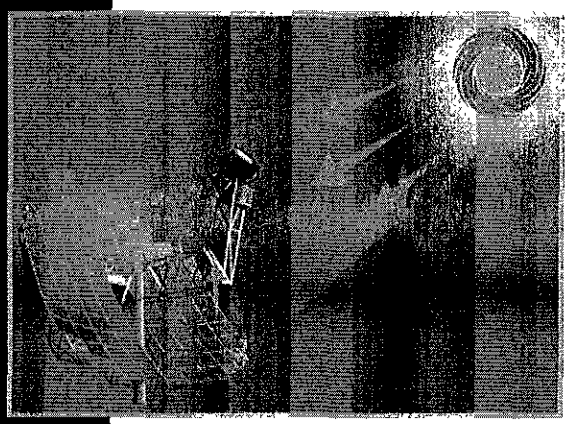


Typical Plant Layout
- 10 MW = 400 Systems
- Land required: Approx. 40 acres
- Only 1% solar shading energy loss
- Grid Interconnected

Plant Control System
- Patented sun tracking system
- Autonomous plant operation
- Weather station
- Utility interface
- Low maintenance

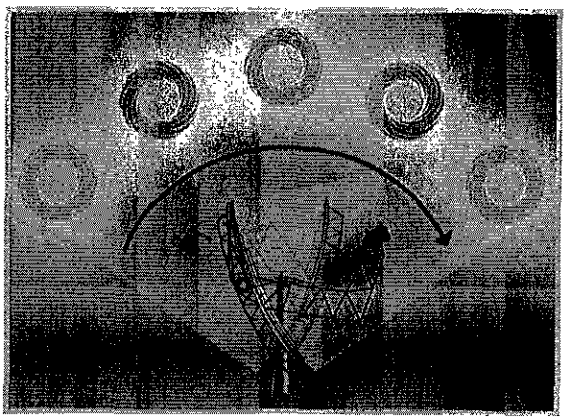
CREATING A SUN-POWERED ECONOMY

Solar dish Stirling technology could become a pollution-free source of industrial energy without contributing to global warming. One dish produces enough electricity for 7 to 10 homes. Here's how it works.

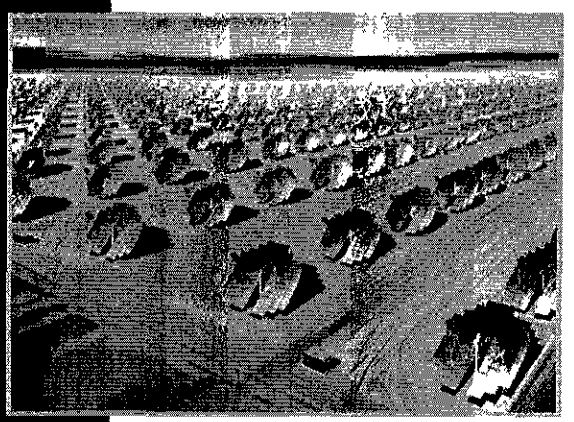


The dish's mirrored reflectors collect the sun's rays and beam them directly to the Stirling engine affixed to an arm protruding from the center of the dish.

The reflected rays cause hydrogen gas in the engine to expand and drive the pistons, generating electricity.



As the day wears on, the solar dish Stirling system pivots to track the sun across the sky.



Electricity produced by thousands of dishes at a solar farm feeds into the power grid.

Transmission lines carry the electricity to homes, offices and factories.

SES

STIRLING ENERGY SYSTEMS, INC.
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